#### THE INTERNATIONAL CONGRESS & EXHIBITION ON DEFENSE TEST, EVALUATION AND ACQUISITION: THE GLOBAL MARKETPLACE

M&S In Support of Test, Evaluation, and Acquisition: Bringing Order and Consistency Across Borders

1 March 2000



Director for Assessment and Evaluation Office of the Assistant Secretary of the Army (ALT)



#### M&S throughout the Life Cycle

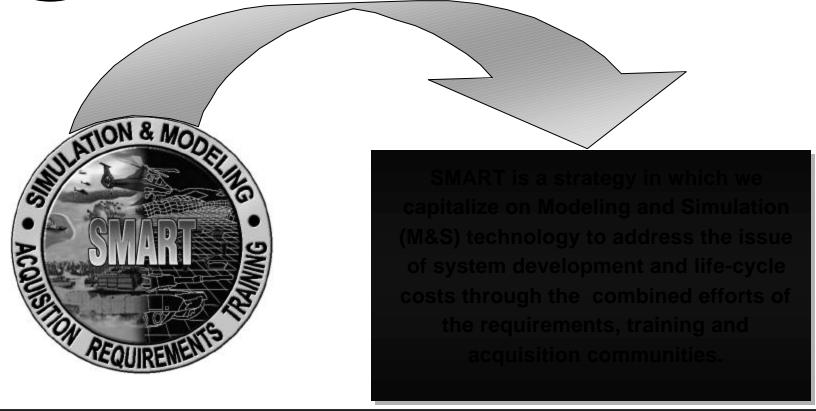


- Mission Need Assessment
- Requirements Determination
- System Design
- System Manufacture
- Test & Evaluation
- Cost Performance Trades (CAIV)
- Tactics, Techniques & Procedures Development
- Supportability
- Training
- Course of Action Analysis
- Mission Rehearsal

The opportunities are endless...

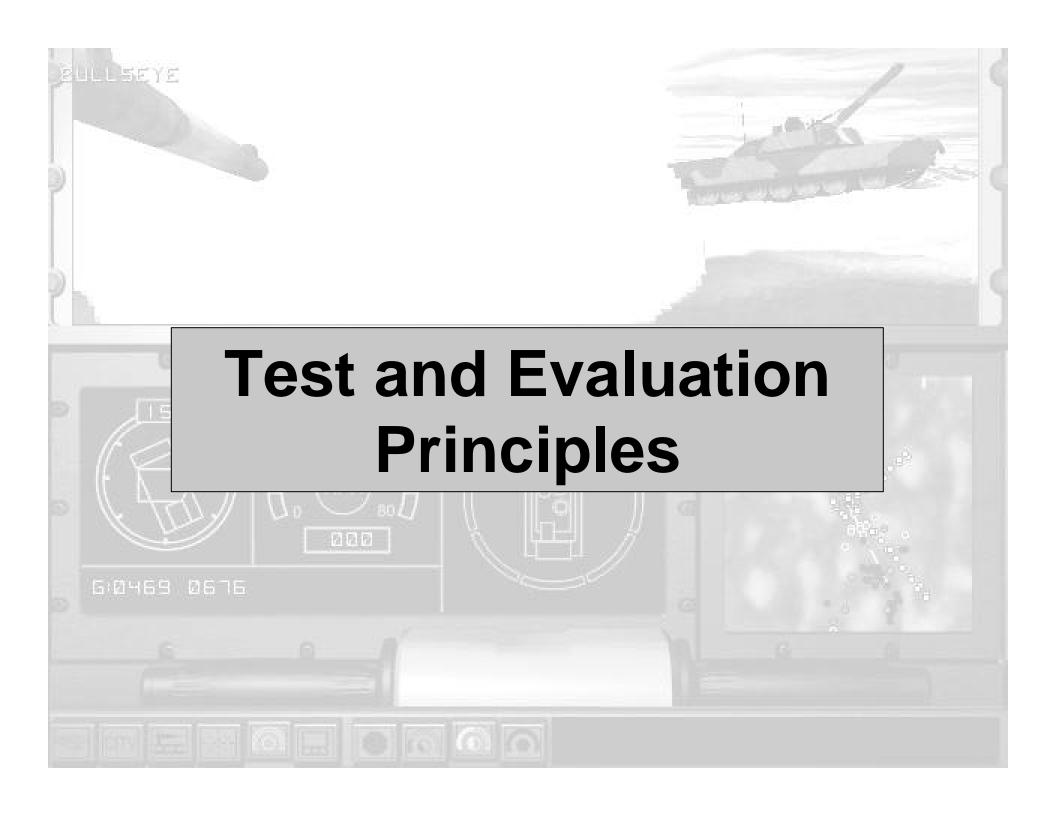


## Simulation and Modeling for Acquisition, Requirements and Training (SMART)



SMART is about collaboration among all stakeholders and multiple uses and reuse of M&S.

Assessment & Evaluation OASA(ALT)





#### Why Do We TEST?



- We test to <u>learn</u> what the acquisition team needs to know about system capabilities to
  - have confidence in what works well
  - learn early what needs improvement, and

 enable the PM to focus efforts on the most important challenges

The Earlier we Learn, <

the Better!



## Considerations in Formulating T&E Strategies



- T&E as a development tool (Try)
  - Assist the materiel and combat developers
- T&E as a management tool (Examine)
  - Provide for risk reduction and assessment of readiness for use in an operational environment
- T&E as support to the decision maker (Prove)
  - Characterize the performance of the system so the Army has a defensible position and we are confident the user gets a good product



#### Why do we Evaluate?



## We evaluate to <u>understand</u> the impact of what we learn on accomplishing the mission

# Modeling and Simulation, an Essential Tool for Test and Evaluation



#### M&S and T&E Respective Roles



- M&S and T&E do not replace each other...
- They complement each other
- The iterative and integrated use of M&S with T&E is of greater value than M&S and T&E conducted in isolation
  - T&E supports validation and authenticating M&S
  - M&S guides T&E to the test conditions in which we can learn the most for the resources expended



#### The Test Philosophy Conundrum



- We learn more from what others call failures than we do from successes
  - Learning a limit of a capability is a success
    - If limit is outside the operational envelope, we meet the user's needs and know the warning signs of the limit
    - If the limit is inside the operational envelope, we know what to fix or can assess a work around
  - Not finding a limit leaves uncertainty about the test method

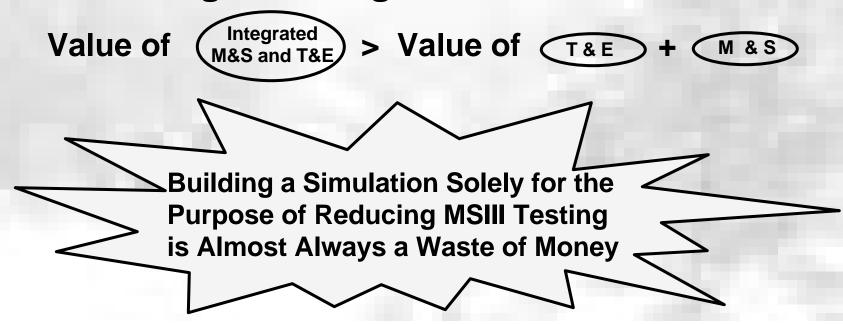
Problem: damned if you do; damned if you don't!



### Models & Simulations are Most Useful for T&E When:



- They were used to design and develop the system
- They matured along with the system
- They had much test data for calibrating/maturing the M&S





#### **USATEC Uses M&S to Support:**

we need to learn

from tests



- Test Design
- Test Preparation
- Overcoming Test Limitations
  - Safety
  - Non-availability of assets
  - Restrictions on peacetime use
- Reducing Test Costs
  - Simulators, Stimulators, Emulators
- Enhancing Evaluation

Avoid wasting test resources

Affordable alternatives

Affordable realism; avoid large deployments



#### Issues



- Issues should be stated as OPEN questions
  - Example closed question:
    Is the munition lethal?
  - Example open questions:
    How lethal is the munition?
    How does lethality vary with conditions of engagement?

Open questions are more conducive to learning



#### Keep the Prospective...



- M&S is not reality
- T&E is not reality
- We learn different things from each; often they are related

M&S Doesn't Make Test; It Makes Them Better!



#### Modeling and Simulation...



Is a tool for learning
Is a medium for collaboration
Is a vehicle for knowledge management
Is NOT reality!

Caveat Emptor: Before using, learn how well the M&S approximates the reality relevant to your applications